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21 December 1965

In Reply Refer To:
AEP-A5-711

TO :



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ATTENTION : Mr. Bill B.

SUBJECT : Budgetary Price Proposal for a Multisensor Aircraft
Development Program

ETV ElectroSystems, Inc. is pleased to present this price proposal for the Engineering, Fabrication, Installation and Flight Test for an Airborne Defensive Surveillance System in accordance with the enclosed Technical Proposal. This effort is proposed in three (3) phases. Phase I will be an Engineering Definition and System Analysis. Phase II will be the actual design of equipment, procurement, aircraft modification and installation and basic aircraft structural and navigational flight test. Phase III will be a four to five month developmental flight test and evaluation program.

Phase I

The intent of this effort is to establish a firm definition and work statement for the subsequent program. This initial effort will encompass the following tasks to be completed within six (6) weeks after contractual authorization to proceed.

1. Perform a complete preliminary design covering the general arrangement of the equipment in the aircraft, required aircraft modification, a preliminary weight summary including estimates of the final configuration based on the best information available at the time.
2. Prepare an overall system analysis and design resulting in detailed system block diagrams with particular emphasis on functional performance and electrical interface requirements.

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3. Accomplish a complete physical inventory of the P2V-7 aircraft and all installed equipment to determine in concert with the Customer which equipment is to remain and which is to be removed for return to the Government.
4. Prepare a preliminary version of the overall system test and evaluation plan which describes in detail all test and evaluation procedures, methods, and reporting requirements.
5. Accomplish preliminary structural analysis on all portions of the aircraft involving modifications to primary structure or modifications which must be analyzed to insure flight safety, and/or for definition of the requirements for Phase II of the program.
6. Prepare in preliminary form an Electro-magnetic Interference Control Plan to be used in the detailed equipment design, fabrication and installation phases.
7. Establish coordination procedures and technical liaison channels with all GFE equipment suppliers as well as suppliers of LTV purchased equipment.
8. Perform a design and error analysis of the automatic bombing system and develop in preliminary form computer program flow diagrams required for implementation of the various functions associated with the bombing system.
9. Identify all major CFE/GFE material requirements and establish availability for each item. With the Customer's assistance and concurrence, categorize all major equipment items as either GFE or CFE.
10. Identify and define, based on best available information, the total program requirements for spares, AGE, GSE and field tech rep support.
11. Obtain preliminary 202C data from the GFE suppliers and establish what additional information will be required.
12. Prepare computer programs as required to implement the proposed computer control techniques for 202C and equipment statusing, installation, wiring data, purchasing requirements and configuration change control.
13. Prepare engineering report covering the Phase I effort and results there from.
14. Prepare work statement, technical proposal, and cost estimates for Phases II and III.

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15. Prepare a full scale cardboard and wood mock-up of two (2) operator stations.

LTV ElectroSystems' firm fixed price quotation for accomplishing this Phase I program is \$25,995. Enclosed is a detailed price breakdown supporting this quotation. This price is firm for a period of sixty (60) days but for scheduling and planning purposes a contractual go-ahead by 3 January 1966 has been assumed.

This price does not include costs for the initial off-site inspection of the P2V type aircraft to be recommissioned for this program. It is now our understanding that these services will be specifically outlined and will be the subject of separate contractual arrangements. It is estimated that approximately sixty-four (64) manhours and round trip air travel costs and expenses for two (2) men to the aircraft location would suffice for the inspection phase.

In accomplishing this Phase I effort, LTV ElectroSystems will require clearances for approximately eight (8) additional people. These people will be mainly in support of the preliminary design and analysis of the navigation system and related computer efforts. It is most desirable that some, if not all, of these clearances be approved concurrently with the go-ahead on the Phase I program.

Phase II

This phase encompasses the implementation of equipment, analysis, design, fabrication, aircraft modification, installation, test and evaluation. As requested by the Customer, LTV ElectroSystems is submitting this phase as budgetary in accordance with the workscope and requirements contained in LTV ElectroSystems' Technical Proposal, Report Number 6400.00.26, dated 21 December 1965. It is anticipated that a firm type commitment will be made as a result of the Phase I effort.

The budgetary price for accomplishing this program, exclusive of ground support equipment, is \$1,608,903. The budgetary price for contractor-furnished ground support equipment is \$169,744. In developing these budgetary quotations it has been assumed that a timely go-ahead will be received on this program in order to maintain continuity of activity between the phases.

For evaluation and analysis purposes, the following high value equipment items are included in the above budgetary price for aircraft modification and installation, excluding ground support equipment.

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<u>Item</u>	<u>Value</u>
1. KA-18 Camera & Control	\$ 129,664.
2. KA-60 Camera & Control	68,244.
3. LN12A Inertial Nav. Sys.	163,786.
4. N1 Compass System	13,649.
5. APN153 Doppler	35,828.
6. APN151 Loran Receiver, Antenna & Coupler	46,946.
7. APQ110 Radar TAR/MAP & Stabilizer Mount	126,524.
8. Defensive Warning System	25,250.
9. Defensive Jamming System	49,818.
10. Communication Systems	25,118.

The above budgetary price for the ground support equipment is based on the following Category I equipment which includes the standard and special equipment required for support of the special mission systems.

<u>Category I Equipment</u>	<u>Required for Flight Test at LTV</u>	<u>Required for Field Use</u>	<u>Price</u>
1. LN12D Inertial Test Bench	X	X	\$ 68,244.
2. APQ-110 Radar Test Fixture	X	X	15,000. *
3. Digital Data System Test Bench	Not Required	X	45,000.
4. Test Harnesses & Cables for such items as defense, communi- cations, ICS, etc.	X	X	4,000.
5. Verdan Computer Test Set	Not Required	X	GFE **
6. Loran Test Set	Not Required	X	24,000.
7. Standard Electronic and Optical Test Equipment such as Oscillo- scopes, Meters, Power Supplies, Camera Test Fixtures, Optical and IR Calibration sources, etc.	Not Required		10,000.
8. Miscellaneous cables, benches tools, cabinets, connectors, adapters, etc.	X	X	3,500.
TOTAL			\$ 169,744.

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* This price constitutes an estimate of a minimum type field test fixture with supporting cabling. The APQ-110 Radar Test Unit, used for heavy maintenance and test, is a standard Air Force test set, and in view of the extensive world wide use of the APQ-110, it is suggested that Customer rely on the standard test set as being available at military installations.

** It is assumed this item can be obtained by Customer at no cost from surplus Air Force inventory, Oklahoma Air Materiel Area.

Category II equipment items required for support of basic aircraft are contained in Paragraph 9.0 of Technical Proposal and are assumed to be GFE. At the present time, it appears that LTV will not require support of this type equipment during Phase II, however, should the need develop, it is assumed the Government will provide such support.

The Phase II budgetary price is based on an initial flight test and evaluation program including one (1) 1-1-300 flight and six (6) modification and/or system shake down flights. It is presently planned that the Phase II Program will be completed by the end of August 1966, with the last three (3) weeks devoted to initial flight test and system shake down.

Three (3) options for the digital data readout have been described in the Technical Proposal under Paragraph 4.3. Option 1 makes use of a modified LTV GS-302A readout system. The Option 1 equipment and installation price is \$47,992. and is included in the budgetary price quoted above, excluding GSE. Option 2 consists of digital readout on board the aircraft and is quoted at a budgetary price of \$20,607. for the specific subsystem. Option 3 provides a semi-automatic display readout and analysis capability suitable for use with standard GP computer equipment and also provides the functions and equipment provided in Option 1. The option 3 equipment is quoted at a budgetary price of \$80,556.

Since various combinations of optional equipment may be utilized, the combining of these various prices will be left to the analysis and evaluation of the Customer.

Phase III

This effort involves a detailed developmental flight test and evaluation program for the purpose of further analysis and refinement of the system over a wide range of operating conditions.

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The budgetary price for accomplishing this program is \$175,634. It is assumed this effort will continue immediately following Phase II and will involve a four to five month period with approximately 200 hours flight time at a frequency of approximately two (2) flights per week.

Schedule

The schedule reflecting the key check points for the entire program is contained in Paragraph 7.1 of the enclosed Technical Proposal. This schedule reflects specific need dates for critical items including Government Furnished Equipment and 202C Data.

General

This proposal, including the three (3) phases, is predicated on the following conditions and assumptions:

1. Contract go-ahead is anticipated by 3 January 1966.
2. The maintenance of the aircraft is limited to the inspection associated with the determination of preflight and postflight discrepancies in support of the flight test program. Due to the unknown condition of the aircraft involved, repair effort and time compliance technical order accomplishment have not been included in this quotation. Recondition and/or IRAN costs are to be developed subsequent to the inspection determining aircraft condition.
3. The following items will be supplied as GFE at no cost to LTV Electrosystems:
 - a. P2V-7 Aircraft with Standard Equipment
 - b. FLIR System
 - c. LLTV System
 - d.
 - e. Down Looking Stereo IR System
 - f. Verdun Computer
 - g. Aircraft and Standard Avionics Equipment Spares
 - h. Armament Pylons
 - i. Ordnance and Markers
 - j. Special Test Ranges or Aircraft need during test
 - k. Tech Support for Special Sensors
 - l. 202-C Data and Handbooks
 - m. Technical Data on present P2V7 Defensive Installation
 - n. Ordnance Ballistic Data

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4. The Customer will arrange for technical assistance, special test equipment and adequate spares in support of GFE items as required.
5. MIL Specs will be used as design guides when applicable.
6. The Customer will supply data on the installation of defensive equipment similar to that proposed by LTV to assure maximum benefit of previous experience and testing.
7. Documentation will be supplied in accordance with Technical Proposal, Paragraph 8.
8. Any spares which are to be the Contractor's responsibility will be provisioned and priced during Phase II.
9. No charge for use of Government Facilities presently available to the Contractor will be allowed in support of this contract. The Facilities Contracts currently in effect are:

Facilities Contract
Contracting Officer

AF 33(600)-41937
Mr. Richard Drew/ASKMF
Wright-Patterson Air Force Base
Dayton, Ohio

Facilities Contract
Contracting Officer

N0w 6137u
Mr. Thomas J. O'Rourke/
NPCO-46
Chief, Bureau of Weapons
Navy Department
Washington, D.C.

The opportunity to provide this service is sincerely appreciated and we hope that the information submitted is sufficient for your favorable evaluation and will allow an early negotiation of a definitive contract for Phase I. We will be happy to supply additional information or be of further service.

LTV ELECTROSYSTEMS, INC.

Original signed by

D. L. Hearn
Vice President and General Manager

Enclosures

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Phase I

Price Breakdown

Direct Labor:

Engineering - Greenville	^{MAN} ^{MOULTS} 12.6	2,027.0 Hrs. @ \$4.63	\$ 9,385. ✓
Production - Prog. Mgmt.	✓	160.0 Hrs. @ \$4.19	670. ✓
Scheduling	1	80.0 Hrs. @ \$2.92	234. ✓

Subtotal

\$ 10,289. ✓

Overhead:

Greenville	@ 84.5%	8,694. ✓
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Subtotal

\$ 18,983. ✓

Other Direct Charges:

(a) Travel	\$1,639.
(b) Premium Pay	<u>328.</u>

Total Other Direct Charges

1,967. ✓

Subtotal

\$ 20,950. ✓

General & Administrative

@ 12.8%	2,682. ✓
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Total Estimated Cost

\$ 23,632. ✓

Profit

@ 10.0%	2,363.
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Total Price

\$ 25,995. ✓~~SECRET~~